National Aeronautics and Space Administration

NASA's Environmental Test Facility

NASA MARSHALL SPACE FLIGHT CENTER
CHAMBER V-20: THERMAL VACUUM TESTING

Chamber V-20 is a 20-foot thermal vacuum facility located at the NASA Marshall Space Flight Center (MSFC) Environmental Test Facility (ETF) in Huntsville, AL.

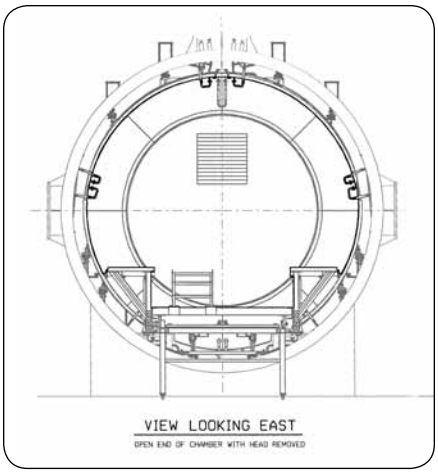
The pumping system for V-20 includes three 36-inch cryopumps, two maglev turbopumps, and one regular turbopump. With its large vacuum capacity, V-20 was manifolded to the V-11 chamber to enable simulation of rapid depressurization typical of a Shuttle launch.

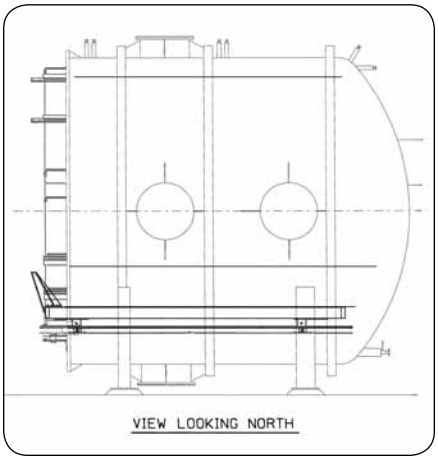
Chamber V-20 previously housed the International Space Station (ISS) Common Berthing Mechanism (CBM). This test setup was responsible for the assembly-level qualification test of the CBM required prior to its purchase from Boeing by NASA. During missions utilizing a CBM, V-20 was brought to conditions simulating the ISS orbit, and the CBM inside was used to simulate activities on orbit. Any problems encountered on orbit could be quickly simulated and resolved at MSFC, thereby providing real-time guidance to the ISS astronauts. The ETF and Boeing supported three successful missions in this manner.

The most unique aspect of V-20 is its 6-DOF mechanism. This mechanism made V-20 the only chamber in the world with the capability to perform actual fly-in and mating of hardware in a simulated space environment.

FACILITY CAPABILITIES

Overall dimension	20 feet in diameter x 28 feet deep
Test article area	17 feet wide x 22 feet deep (see illustration)
Data system	Pacrats IFIX
Temperature range	-170 ºC to +200 ºC
Pressure	1 x 10^{-6} Torr
Thermocouples	486
LN_2 shroud	Yes
Lamps	Nine zones, 6 x 1,600-watt infrared (IR) bulbs each
RGA	Yes
TQCM	Yes
Internal camera	IR and color





FACILITY APPLICATIONS

Commercial, military, and NASA programs

CONTACT INFORMATION

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